UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 8
1595 Wynkoop Street
DENVER, CO 80202-1129
Phone 800-227-8917
http://www.epa.gov/region08

Ref: 8P-AR

James Parker
Manager - Compliance Services
PPL Montana - Colstrip
P.O. Box 38
Colstrip, MT 59323

Re: *Best Available Retrofit Technology (BART) Assessment Colstrip Generating Station*

Dear Mr. Parker:

On February 28, 2007, EPA Region 8 sent a letter to PPL Montana - Colstrip (PPL) that provided the results of our "subject to" modeling for Best Available Retrofit Technology (BART) and requested that Colstrip perform a BART analysis for Units 1&2 and submit it to EPA Region 8. On August 8, 2007, Colstrip submitted a BART analysis to EPA that was performed by TRC. We would like to thank you for submitting the BART analysis and recognize the effort that has gone into developing this document.

We have completed our initial review of the August 8, 2007 submittal and have determined that there is additional information and analysis needed from Colstrip in order for us to complete our review. Following are EPA Region 8's comments on the analysis. In addition, we are attaching a copy of comments on the BART analysis for Colstrip Units 1&2 submitted to EPA on November 5, 2007 from the National Park Service.

Visibility Improvement and Impacts

Throughout your analysis, you state that the amount of visibility improvement resulting from a reduction in emissions, based on your current BART analysis, would not be discernible and therefore additional controls are not justified. The visibility improvement for SO2, NOx, and PM in your analysis are all below 1.0 deciviews, and this is used as a reason not to implement more stringent control measures. EPA disagrees with your assertion. EPA states in the preamble to its BART Guidelines that, "Even though the visibility improvement from an individual source may not be perceptible, it should still be considered in setting BART because the contribution to haze may be significant relative to other source contributions in the Class I areas." (see 70 FR 39129, July 6, 2005). Visibility modeling shows that for Class I areas in Montana, and in particular U.L. Bend National Wildlife Refuge, Colstrip Units 1&2 have the largest impact of any single stationary source in Montana.

Failing to consider less-than-perceptible contributions to visibility impairment would ignore the Clean Air Act's (CAA) intent to have BART requirements apply to sources that contribute to, as well as cause, such impairment (see 70 FR 39129, July 5, 2006). The BART Guidelines indicate that for purposes of determining which sources are subject to BART, "A single source that is responsible for a 1.0 deciview change or more should be considered to "cause" visibility impairment; a source that causes less than a 1.0 deciview change may still contribute to visibility impairment and thus be subject to BART." (see 70 FR 39161, July 5, 2006). The BART Guidelines further state that "As a general matter, any threshold that you use for determining whether a source "contributes" to visibility impairment should not be higher than 0.5 deciviews" (see 70 FR 39161, July 5, 2006). Given that EPA has said that sources are subject to BART based on a contribution threshold of no greater than 0.5 deciviews, it would be inconsistent to automatically rule out additional controls where the improvement in visibility may be less than 1.0 deciview or even 0.5 deciviews. The Colstrip BART analysis shows that a 0.5 or greater deciview reduction is achievable for both NOx and SO2 as individual pollutants at one Class I area, U.L. Bend, and demonstrates that with reductions in NOx and SO2 combined, there is the potential for a 1.0 deciview or more improvement.

General Comments

1. PPL's analysis is based on adding control technology to meet what it terms "best demonstrated technology." PPL assumes recently updated NSPS emission limits for particulates, S02, and NOx represent best demonstrated technology and does not take into account the highest efficiency many of these control technologies are capable of achieving. However, the BART Guidelines state that "It is not our intent to require analysis of each possible level of efficiency for a control technique as such an analysis would result in a large number of options. It is important, however, that in analyzing the technology you take into account the most stringent emission control level that the technology is capable of achieving. You should consider recent regulatory decisions and performance data *(e.g.,* manufacturer's data, engineering estimates and the experience of other sources) when identifying an emissions performance level or levels to evaluate." (see 70 FR 39166, July 6, 2005). Throughout your analysis, you have not evaluated control technologies with the most stringent emission control level, resulting in inflated calculated cost effectiveness values. PPL needs to redo the analysis for control technologies using the most stringent emission control level that the technology is capable of achieving. Specific examples of this include:
    - PPL should re-evaluate the costs and benefits of reducing SO2 based on a higher removal efficiency. For S02, PPL only estimates a 91% removal efficiency with additional control technology, but in the EPA Control Cost Manual, EPA states that most absorbers have removal efficiencies in excess of 90%, and packed tower absorbers have removal efficiencies as high as 99.9% ("EPA Air Pollution Control Cost Manual", Sixth ed., EPA-452-02-001, January 2002, Section 5.2, Chapter 1, pg 1-3).
    - The BART analysis assumed that the addition of selective non-catalytic reduction (SNCR) to separated overfire air (SOFA) could reduce NOx emissions by about 11% over SOFA. However, EPA estimates that SNCR can reduce NOx by 40% -

50% for a boiler this size (EPA 2002, Section 4.2, Chapter 1, pg 1-3). PPL should re-evaluate SNCR at these higher efficiencies.

- PPL has assumed that the addition of selective catalytic reduction (SCR) would reduce NOx, by 17% to 0.15 lb/MMbtu. However, EPA estimates that SCR can reduce NOx, by 70% - 90%+ for a boiler this size (EPA 2002, Section 4.2, Chapter 2, pg 2-3). If SCR is capable of reducing emissions below PPL's target, then the amount of the reductions and consequent visibility improvements will increase. PPL should re-evaluate SCR at these higher efficiencies.

2. The cost analysis for the control technologies included in the analysis does not contain the proper documentation to support the costs contained in the appendices. The BART Guidelines state that "Once the control technology alternatives and achievable emissions performance levels have been identified, you then develop estimates of capital and annual costs. The basis for equipment cost estimates also should be documented, either with data supplied by an equipment vendor *(i.e.,* budget estimates or bids) or by a referenced source (such as the OAQPS *Control Cost Manual,* Fifth Edition, February 1996, EPA 453/B-96-00 1). In order to maintain and improve consistency, cost estimates should be based on the OAQPS *Control Cost Manual,* where possible." (see 70 FR 39166, July 6, 2005). PPL needs to provide the proper documentation to support the costs used in the analysis. Please note that the "OAQPS Control Cost Manual", Fifth Edition, referenced above has been replaced by the "EPA Air Pollution Control Cost Manual", Sixth Edition, January 2002.

3. There is a discrepancy between the emission rates discussed in the text and those presented in tables 4-7 and 4-9. For example, the text on page 4-19 discusses reaching 0.18 lb/MMBtu of NOx through the application of SOFA, however table 4-9 shows that the application of SOFA would achieve only 0.23/0.27 lb/MMBtu. It appears that the lower emission numbers in the text reflect 24-hour averaging times, while those in the table reflect 30-day rolling averages. Since the EPA/WRAP modeling that was conducted to determine that Colstrip is subject-to-BART was based on 24-hour actual emission rates, we believe that modeling conducted to show the visibility improvement from applying controls should also be based on 24-hour averages. In addition to the modeling that has been provided, PPL needs to remodel the control measures based on 24-hour averages.

SO2 Emissions and Controls

4. The analysis used 11 years for the remaining useful life for all of the control technologies. However, the typical useful life of these control technologies is expected to be 15 years based on information from the EPA Control Cost Manual (EPA 2002, Section 5.2, Chapter 1, pg. 1-28). The boilers are expected to have a useful life beyond 20 years, and therefore do not have any effect on the useful life determinations. PPL needs to reanalyze the annualized costs for the control technologies using fifteen years as provided in the EPA Control Cost Manual.

5. In your BART analysis, you did not analyze any fuel switching options for SO2 control. Fuel substitution to lower the fuel sulfur content can be a very cost effective means for reducing SO2 emissions and should be analyzed. The analysis does state that coal cleaning would not result in sulfur reductions; however there are no calculations or documentation that supports this. PPL needs to provide an analysis for fuel switching options and provide an analysis to show what emission reductions coal cleaning would result in.

6. In the portion of the analysis pertaining to energy impacts, you state that cost estimates are based on experience from Colstrip Units 3&4. PPL needs to provide additional information and documentation to explain how it translated the energy impacts at Units 3&4 to Units 1&2.

7. The BART Guidelines indicate that EGUs with pre-existing post-combustion controls achieving removal efficiencies of at least 50% should consider upgrades to the current scrubbers. PPL currently has pre-existing post-combustion controls with venturi wet scrubbers achieving at least 50% control efficiency. In the BART analysis, PPL only considers the addition of lime to the scrubbers as a possible upgrade. The BART Guidelines provide additional information on what upgrades and improvements sources should consider to existing wet scrubbers. The Guidelines state "For those BART-eligible EGUs with preexisting post-combustion SO2 controls achieving removal efficiencies of at least 50 percent, your BART determination should consider cost effective scrubber upgrades designed to improve the system's overall SO2 removal efficiency. There are numerous scrubber enhancements available to upgrade the average removal efficiencies of all types of existing scrubber systems. We recommend that as you evaluate the definition of "upgrade", you evaluate options that not only improve the design removal efficiency of the scrubber vessel itself, but also consider upgrades that can improve the overall SO2 removal efficiency of the scrubber system. Increasing a scrubber system's reliability, and conversely decreasing its downtime, by way of optimizing operation procedures, improving maintenance practices, adjusting scrubber chemistry, and increasing auxiliary equipment redundancy, are all ways to improve average SO2 removal efficiencies. We recommend that as you evaluate the performance of existing wet scrubber systems, you consider some of the following upgrades, in no particular order, as potential scrubber upgrades that have been proven in the industry as cost effective means to increase overall SO2 removal of wet systems: (a) Elimination of Bypass Reheat; (b) Installation of Liquid Distribution Rings; (c) Installation of Perforated Trays; (d) Use of Organic Acid Additives; (e) Improve or Upgrade Scrubber Auxiliary System Equipment; (f) Redesign Spray Header or Nozzle Configuration." (see 70 FR 39171, July 6, 2005). PPL needs to provide an analysis for upgrades to the current scrubbers that includes the upgrades suggested by the BART Guidelines and any other improvements to this control equipment that may be appropriate.

NOx Emissions and Controls

8. The analysis used 11 years for the remaining useful life for all of the control technologies. However, the typical useful life of these control technologies is expected to be 20 years based on information from the EPA Control Cost Manual (EPA 2002, Section 4.2, Chapter 1, pg. 1-39). The boilers are expected to have a useful life beyond 20 years, and therefore do not have any effect on the useful life determinations. PPL needs to reanalyze the annualized costs for the control technologies using twenty years as provided in the EPA Control Cost Manual.

9. You state in the BART analysis that the new NOx NSPS level is below the presumptive BART level and therefore was not analyzed. The BART Guidelines require an analysis of a level of control equivalent to NSPS, even if it is below the presumptive limits. Specifically, the BART Guidelines state that "Where a NSPS exists for a source category (which is the case for most of the categories affected by BART), you should include a level of control equivalent to the NSPS as one of the control options. The NSPS standards are codified in 40 CFR part 60. We note that there are situations where NSPS standards do not require the most stringent level of available control for all sources within a category. For example, postcombustion NOx controls (the most stringent controls for stationary gas turbines) are not required under subpart GG of the NSPS for Stationary Gas Turbines. However, such controls must still be considered available technologies for the BART selection process." (see 70 FR 39164). PPL needs to provide an analysis for NOx that is equivalent to the current NSPS.

10. In your analysis for adding Separated Overfire Air (SOFA), you state that you based cost estimates on recent upgrades to the burners in Units 3&4. PPL needs to provide additional information and documentation to explain how it translated the costs of adding SOFA at Units 3&4 to Units1&2.

11. Units 1&2, currently controlled by low-NOx burners (LNB), are subject to the presumptive limits in the BART Guidelines, which are .15 lb/MMbtu for tangential-fired, sub-bituminous fired boilers. The BART Guidelines state "Most EGUs can meet these presumptive NOx limits through the use of current combustion control technology, i.e. the careful control of combustion air and low-NOx burners. For units that cannot meet these limits using such technologies, you should consider whether advanced combustion control technologies such as rotating opposed fire air should be used to meet these limits." (see 70 FR 39172, July 6, 2005). In addition to the analysis for SOFA, SNCR, and SCR, PPL should analyze new control technologies than can achieve higher control levels than LNB and SOFA. Some of the technologies PPL should analyze include advanced separated overfire air (ASOFA), rich reagent injection (RRI), and rotating overfire air (ROFA).

12. Table A4-8(a) contains an error. The value for uncontrolled annual emissions is 5,166.50 tpy, which should be 5,616 tpy, as it is in Table A4-8(b) and Table A4-8(c). The

incorrect value was carried forward in the cost effectiveness calculations. PPL needs to revise Table A4-8(a) and well as any cost effectiveness calculations that are affected by this.

Particulate Matter Emissions and Controls

13. On page 4-10 of the BART analysis, you state that "Wet scrubbers are currently operating to control particulate and SO2 emissions on Colstrip Units 1&2. While enhancements to particulate collection efficiency are potentially possible, the filterable emission rates of 0.047 and 0.058 lb/MMBtu, as determined from stack testing, are already very low and indicative of excellent control efficiency for this technology. Furthermore, enhancement of the wet scrubbers would not be expected to result in additional particulate removal. Accordingly, ESP and FF controls were the applicable and available control technologies to enhance the already 98% particulate control efficiency of the Colstrip Units 1&2 boilers." PPL needs to provide an analysis or information for the basis of the statement that 98% control efficiency can not be enhanced to perform better.

14. The PPL PM10 BART analysis assumes that the lowest emission rate achievable by either a fabric filter (baghouse) or an Electrostatic Precipitator (ESP) is 0.015 lb/MMBtu. However, EPA has proposed that the Desert Rock power plant will meet a filterable PM10 limit of 0.010 lb/MMBtu (see Desert Rock Energy Center Proposed Permit, AZP 04-01, http://www.epa.gov/region09/air/pemit/deserocdesert-rock-proposed-permit.pd). PPL should re-evaluate the costs and benefits of reducing PM10 to the level that EPA has said represents Best Available Control Technology using techniques developed in the EPA Control Cost Manual.

In order to move forward with the BART process, we ask that you submit the requested information and analysis to our office within thirty days from the date of this letter.

Once again, we would like to thank you for submitting the BART analysis and acknowledge the work that has gone into preparing this analysis. If you have any questions, please contact Laurel Dygowski at (303) 312-6144.

Sincerely,

Callie A. Videtich, Director
Air and Radiation Program